W5YI

America's Oldest Ham Radio Newsletter

REPORT

Up to the minute news from the world of amateur radio, personal computing and emerging electronics. While no guarantee is made, information is from sources we believe to be reliable.

May be republished providing credit is given to *The W5YI Report.*

Fred Maia, W5YI, Editor, P.O. Box 565101, Dallas, TX 75356-5101
Electronic mail: fmaia@internetMCI.com Website: http://www.w5yi.org
Tel. 817-461-6443 FAX: 817-548-9594

In This Issue...

Vol. 18, Issue #18 **$1.50** PUBLISHED TWICE A MONTH **September 15, 1996**

SENATE BILL SEEKS TO REGULATE CB INTERFERENCE

A bill has been introduced into Congress which attempts to transfer the regulation of interference to home electronic equipment from the federal government to the states. The good news is that it specifies CB radio interference resulting from the use of illegal equipment. The bad news, is that it sets a dangerous precedent.

Several questions are also raised, such is who is going to determine when the rules are being violated - especially when the FCC no longer investigates interference to consumer electronics? And what about legal radio equipment that interferes with a poorly shielded telephone or television set considered to be operated properly?

The greater proportion of TVI is due not to spurious radiations or high power operation but to television deficiencies. Most consumers believe that interference is the radio operator's fault if it stops when the transmitter is not being used. How long will it be before a legal ten meter sideband transmitter operating on 28.3 MHz running 200 watts will be compared to an illegal overpower CB transceiver operating on 27.5?

There are also some types of interference (such as non-linear junctions) that result from radio energy acting on dissimilar metals or rust. Here is the text of the CB interference bill introduced by Sen. Russ Feingold, D-WI. (Tel. 202-224-5323.)

By Mr. FEINGOLD: S. 2025. A bill to amend the Communications Act of 1934 to authorize the States to regulate interference with radio frequencies; to the Committee on Commerce, Science, and Transportation.

Mr. FEINGOLD. Mr. President, I rise today to introduce legislation which creates a commonsense solution to a growing problem in U.S. cities and towns -- the Federal preemption of State and municipal regulation of citizens band [CB] radio frequency interference with residential home electronic or telephone equipment. This problem can be extremely distressing for residents who cannot have a telephone conversation or watch television without being interrupted by a neighbor's citizen band radio [CB] conversation.

Under the current law, those residents have little recourse. Interference of CB radio signals with household electronic equipment such as telephones, radios, and televisions has been regulated by the Federal Communications Commission [FCC] for nearly 30 years.

Up until recently, the FCC has enforced rules outlining what equipment may or may not be used for CB radio transmissions, what content may or may not be transmitted, how long transmissions may be broadcast, what channels may be used, as well as many other technical details.

FCC also investigated complaints that a personal radio enthusiast's transmissions interfered

THE W5YI REPORT [Pub. No. 009-311] is published twice monthly by The W5YI Group, Inc., 2000 E. Randol Mill Road # 608-A, Arlington, TX 76011
SUBSCRIPTION RATE: (U.S., Canada and Mexico) One Year (24 issues) $24.50 • Two Years: $45.00 • Three Years: $64.00. • Tel. 817/461-6443
Foreign Subscriptions via Air Mail: $39.50 per year. (Payment may be made by Check, Money Order, VISA or MasterCard payable in U.S. funds.)
Periodicals Postage paid at Arlington, TX. **POSTMASTER:** Send address changes to THE W5YI REPORT, P.O. Box 565101, Dallas, TX 75356

with a neighbor's use of home electronic and telephone equipment. FCC receives nearly 45,000 such complaints annually.

"Mr. President, for the past 3 years I have worked with constituents who have been bothered by persistent interference of nearby CB radio transmissions. In each case, the constituents have sought my help in securing an FCC investigation of the complaint. In each case, Mr. President, the FCC indicated that due to a lack of resources, the Commission no longer investigates radio frequency interference complaints. Instead of investigation and enforcement, the FCC is able to provide only a packet of self-help information for the consumer to limit the interference on their own.

"Municipal residents, after being denied investigative or enforcement assistance from the FCC, frequently contact their city or town government and ask them to police the interference. However, the *Communications Act of 1934* provides exclusive authority to the Federal Government for the regulation of radio, preempting municipal ordinances or State laws regulating radio frequency interference. This has created an interesting dilemma for municipal governments. They can neither pass their own ordinances to control CB radio interference, nor can they rely on the agency with exclusive jurisdiction over interference to enforce the very Federal law which preempts them.

"In Beloit, WI, as in many Wisconsin communities, this dilemma has been extremely frustrating for local residents who have been powerless to prevent the transmissions of a neighboring CB enthusiast from interfering with their home electronic equipment.

"One Beloit resident, after having adopted every form of filtering technology for her telephone and other electronic equipment, still experienced persistent interference. Her answering machine picks up calls for which there is no audible ring, and at times records ghost messages. Often, she cannot get a dial tone when she or her family members wish to place an outgoing call. During telephone conversations, the content of the nearby CB transmission can frequently be heard and on occasion, her phone conversations are inexplicably cut off. Her neighbors have experienced similar problems and have complained to the Beloit City Council.

"Last month, the Beloit City Council, exasperated by FCC inaction on this matter, passed an ordinance allowing the city to enforce FCC regulations on this type of inference. While the council knew that, if challenged under current law, their ordinance would likely not be upheld by the courts, they felt they had little choice if they wished to address their constituents' concerns.

"Mr. President, it is not fair that municipalities and their residents should be hamstrung by an outdated Federal preemption of laws the Federal Government no longer has the resources to enforce. The legislation I am introducing today will help the city of Beloit, and many other municipalities like it, to regulate CB radio transmissions and to enforce those regulations.

"My bill provides a limited exception to the Federal preemption of State or local laws on radio frequency interference. It simply allows State and local government to regulate CB radio interference when that interference results from a violation of FCC rules. Thus, States and municipalities can use their enforcement resources to investigate and enforce Federal law thereby protecting the rights of their residents. Even the FCC recognizes that States and localities need to be able to protect their citizens.

"Mr. President, this bill simply allows common sense to prevail. If Federal regulators cannot enforce the rules over which they have exclusive jurisdiction, States and localities should be given the authority to investigate and enforce those regulations for them. I hope my colleagues will support this important legislation. Mr. President, I ask unanimous consent that the bill be printed in the Record.

"There being no objection, the bill was ordered to be printed in the Record, as follows:"

S. 2025 - Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. AUTHORITY OF STATES TO REGULATE RADIO FREQUENCY INTERFERENCE.

Section 302 of the Communications Act of 1934 (47 U.S.C. 302) is amended by adding at the end the following: (e) Where radio frequency interference to home electronic equipment is caused by a CB Radio Station through the use of a transmitter or amplifier that is not authorized for use by a CB Radio Station pursuant to Commission rules, the state, county, municipal, or other local government shall not be preempted from exercising its police powers to resolve the interference by prohibiting the use of such unauthorized equipment or by imposing fines or other monetary sanctions.

For purposes of this subsection, home electronic equipment includes, but is not limited to, television receivers, radio receivers, stereo components or systems, video cassette recorders, audio recorders, loud speakers, telephone equipment, and other electronic devices normally used in the home.

Any action taken by the state, county, municipal, or local government shall not preclude concurrent action by the Commission. Nothing in this subsection shall be construed to diminish the Commission's exclusive jurisdiction over radio frequency interference in any matter outside the scope of this subsection.

W5YI REPORT

America's Oldest Ham Radio Newsletter

September 15, 1996

STS-79 NOW SET TO LAUNCH ON SEPTEMBER 16TH

The flight of STS-79 appears on again. That is after Hurricane Fran forced a third roll-back of the Shuttle Atlantis to the Vehicle Assembly Building. On Sept. 3rd, Kennedy Space Center went into "HurCon 3" alert. The spacecraft has now been returned to Launch Pad 39A.

Originally scheduled for July 31st, NASA delayed the flight until mid-September so that technicians could replace the reusable solid rocket boosters on the Space Shuttle Atlantis. The motor change-out was forced when NASA uncovered a failed leak check on the previous STS-78 orbiter. New adhesives and cleaning fluids had been used on that space craft which allowed hot gasses to penetrate a rubber joint. Atlantis' new motors use the old adhesive material. Countdown begins on Sept. 13.

Liftoff is now scheduled for Sept.16th at about 4:54 a.m. (EST) from the Kennedy Space Center at Cape Canaveral, Florida. The launch will place the shuttle into Earth orbit at an altitude of 196-245 statute miles and an inclination of 51.6 degrees. The mission is the 79th in the shuttle series ...and the 17th flight of Atlantis.

STS-79 is also the fourth in a series of joint American-Russian space shuttle missions. On September 18, the Shuttle Atlantis will dock with the Russian space station and pick up Shannon Lucid who has been aboard Mir since late March. Astronaut John E. Blaha will be left in her place. The target landing date at KSC is Sept. 26 at 8:49 a.m. - a mission duration of 10 days and 4 hours.

The crew of six (which includes three licensed ham operators) consists of: William F. Readdy - Commander, Terrence W. Wilcutt - Pilot, and four Mission Specialists: Thomas D. Akers, John E. Blaha (KC5TZQ), Jay Apt (N5QWL) and Carl E. Walz (KC5TIE). Although Atlantis' bay will carry the SpaceHab module - a health sciences investigation, the primary mission of STS-79 is the fourth Mir docking. The shuttle crew will dock with the Mir space station and ferry supplies, personnel and scientific equipment to the complex 240 miles above the earth.

STS-79 is also a SAREX (Shuttle Amateur Radio Experiment) mission and ham radio operators and students will attempt to make radio contacts with the orbiting shuttle. Amateur radio has been flying aboard the shuttles since 1983. To make the radio contacts, the astronauts will use the Mir radio aboard Atlantis that is used to communicate with the Russian spacecraft during the docking maneuver.

This is Jay Apt's (N5QWL) fourth shuttle flight. And making his fifth shuttle mission is John Blaha (KC5TZQ) ...STS-79 is Carl Walz's (KC5TIE) third. During SAREX missions, the astronauts typically make scheduled ham radio contacts with schools, random radio contacts with the ham radio community and personal contacts with their families. Schools are selected from around the world to make contact with the shuttle during most SAREX missions. These contacts are prearranged giving the schools a greater chance of making a successful contact. A few students at each of the selected schools ask questions of the astronauts during the contact. The nature of these contacts embodies the primary goal of SAREX — to excite student's interest in learning. The following schools were selected by the SAREX Working Group for a scheduled radio contact during this mission:

- Andover Middle School, Andover Kansas
- Immaculate Conception Elem. School, Celina, Ohio
- Royal School for Girls, Haslemere, Surrey, England.

Since this flight is a shuttle-Mir docking mission, and SAREX and Mir Amateur Radio stations sometimes share the same downlink frequency (145.55 MHZ), the SAREX Working Group has decided to use the following frequencies during this mission.

FM Voice Downlink: 145.84 MHZ
FM Voice Uplink: 144.45, 144.47 MHZ

Please do NOT transmit on the shuttle's downlink frequency. The downlink is your receiving frequency. The uplink is your transmitting frequency. The crew will not favor either uplink frequency. FM voice call signs will be N5QWL, KC5TIE and KC5TZQ.

The SAREX hardware will be flown in configuration "M" - which uses the shuttle/Mir radio for FM voice radio contacts. During final approaches to the Mir Space Station, a VHF radio is used by the shuttle Commander to radio the Mir crew by ship-to-ship communications, providing shuttle status and keeping them informed of major events from that point on, including confirmation of contact, capture and conclusion of damping.

For further information, listen to the ARRL's Amateur Radio station (call sign W1AW) which transmits news bulletins (9:45 p.m., 12:45 a.m. Eastern) on the HF bands at 1.855, 3.99, 7.29, 14.29, 18.16, 21.39, 28.59 MHZ and in the Connecticut-area on VHF at 147.55 MHZ. W1AW bulletins are also forwarded on packet.

Members of the Goddard Amateur Radio Club (Greenbelt, MD) re-transmit live shuttle air-to-ground audio over the amateur frequencies from their club station, WA3NAN. To listen-in, tune to 3.86, 7.185, 14.295, 21.395, and 28.65 MHZ on the HF bands ...and in the Maryland/DC area on VHF at 147.45 MHZ.

Keperlian elements to track the shuttle are available on the World Wide Web at: http://spacelink.msfc.nasa.-gov - (Internet TCP-IP address is 192.149.89.61)

Send reports and QSLs to: ARRL EAD, STS-79 QSL, 225 Main Street, Newington, CT 06111-1494. Include the following information in your report: STS-79, date, time in UTC, frequency and mode (FM voice). In addition, you must also include a SASE (large business-sized self-addressed-stamped envelope) if you wish to receive a card. The Bergen Amateur Radio Association in New Jersey has generously volunteered to manage the cards for this mission.

W5YI REPORT

America's Oldest Ham Radio Newsletter

Page #4

September 15, 1996

ARRL/VEC TO OFFER FREE ELECTRONIC FILING OF FCC FORMS 610 FOR ARRL MEMBERS

Effective immediately, the ARRL/VEC will electronically file with the FCC Forms 610 for ARRL Members. The ARRL/VEC can electronically file FCC Form 610 applications for amateur station license renewals, or for address, name or call sign changes. This service is FREE to current ARRL Members.

What is required to use this ARRL Member service?

ARRL Members must send a correctly-completed, signed and dated original Form 610 to the ARRL/VEC. Members can send the Form 610 by US mail, by courier, or hand deliver to: ARRL/VEC, 225 Main St, Newington CT 06111 (USA).

Applications received by the ARRL/VEC must include an original signature. Forms 610 cannot be accepted via fax.

Special Information Regarding Applications:

→ **Renewals (Box 4F):** Only applications for renewal made on FCC Form 610 may presently be electronically submitted by VECs. For now, VECs cannot process computer-generated Forms 610-R (which are mailed by the FCC directly to upcoming expirees)--those must go directly to the FCC (also, VECs cannot presently process FCC Forms 610-A, 610-B, 610-R or 610-V).

FCC Rules stipulate that renewals be submitted to them no earlier than 90 days before the license expiration date. Licenses that have been expired for less than two years may still be reinstated--a Form 610 for renewal must be submitted to a VEC or FCC before the two year grace period has ended.

→ **Systematic Call Sign Changes (Box 4E)**: Applications submitted for a systematic call sign change must have Box 4E checked, and the applicant must initial the line adjacent to the box.

→ **Address Changes (Box 4D):** Applications must include a current mailing address that is within the United States or its Possessions/Territories (where mail can be delivered by the United States Postal Service).

→ **Name Changes (Box 4C):** Applications submitted for a name change must include a copy of a legal document showing the formal name change. The former name must be written on the line next to Box 4C. Typographical errors can be corrected using Form 610.

Any questions regarding Form 610 application processing for ARRL Members can be directed to the ARRL/VEC by calling 860-594-0300 (weekdays and evenings, from 8 am to 9 pm eastern time).

FCC ASSISTS COAST GUARD BY INVESTIGATING SOURCE OF FALSE MARITIME DISTRESS CALLS

Agents from the FCC's Philadelphia Field Office responded to a request for assistance from the U.S. Coast Guard in Atlantic City. It seems they were having an ongoing problem of one or more presons repeatedly transmitting false distress signals on the marine emergency channel and deliberately jamming transmissions of actual distress calls from other vessels.

Due to the intermittent nature, and short duration of the transmissions, FCC investigators relied on Precise Fixed Direction Finders which were positioned in the area. The subjects turned out to be two juveniles who were transmitting from their parents boat which was docked at the rear of the residence.

The transmitter was tested and found to be a match with the ID of the false distress calls. This information, along with the tape recordings of the calls, were reviewed by the children and their parents. At that time, the children admitted guilt for the hoax calls. The case was returned to the Coast Guard, and fines to pay for operational costs may be imposed. Maximum penalty for false distress calls is a $250,000 fine and up to 6 years in prison. The Coast Guard can also assess costs of $400 per hour or more to reimburse expenses associated with deployment of search aircraft and marine vessels.

- The newsletter of the *Society of Wireless Pioneers* reports that **CW is very much alive in Third World Countries.** India, China and various Mediterranean nations still use 500 kHz to transmit weather reports to ships at sea. The bulk of the traffic once handled by CW by ships of the industrialized countries, however, is now handled via satellite. SOWP concludes that Third World countries will retain maritime CW in spite of the changeover to GMDSS (the satellite-based Global Maritime Distress and Safety System) on February 2, 1999.

- According to *Morsum Magnificat* (a British Morse enthusiast's publication) **the BBC-TV News on July 16th reported that at present the GMDSS system is in near collapse.** It seems that more than 95 percent of distress calls received are false. The reason given range from unskilled personnel to amateur yachtsmen improperly storing distress beacons in their garages. One Coast Guard station received 959 false calls in the last year!

- **Ham stamp collectors will love the new stamps issued this month by Pitcairn Island.** One ($2.50) shows Andrew Young, VR6AY, Pitcairn's first amateur, in 1938 operating a Morse key. The 20¢ stamp lists the call signs of this year's members of the Pitcairn amateur radio club, and two others, at $1.50 show VR6IM requesting and receiving medical advice by radio. *(Also reported by Morsum Magnificat, August 1996.)*

EMERGING TECHNOLOGY

■ **Juno Electronics (Salisbury, MD) is off and running with their completely free Internet Electronic Mail service.** They already claim 144,000 members. There are no monthly or start-up fees to send an unlimited number of messages (but not "attachments") to anyone providing you agree to also accept display advertising located in a strip at the top of your screen. The upscale service offers a built-in spell-check feature, folders to store messages, an address book ...even custom font and color selection. Juno doesn't really connect you directly to the Internet, instead it uses a private data network (similar to MCI Mail) to get to the outside world. You can get Juno (Microsoft "Windows") software by calling 1-800-988-JUNO. You have to answer 18 questions about your computer habits, income, hobbies, job, education, etc., as part of the sign-up process.

The down-side is that Juno may sell your name/address (and preferences) to other companies ...and you can expect to eventually get junk E-mail advertising messages. Freemark Communications (Cambridge, MA) is another company that offers free E-mail.

■ **Microsoft and American Express are teaming up to bring an "intelligent" on-line travel booking service** to vacationers and corporate employees. A feature will allow corporate travel managers to program in their firm's travel guidelines. Offered will be trip planning, expense-account reporting, a hotel directory and free maps. American Airlines and their Sabre reservation system is testing a similar system.

■ **Video news packages will soon be delivered over the telephone via modem to your computer.** Major news media and content suppliers (among them: the Times-Mirror Co., Knight-Ridder, the Boston Globe and CNN) have signed on with PointCast - a little known company whose technology turns a PC into a high-tech multi-media TV set. Millions of people have already downloaded their free software!

■ Advertisers are sinking big money into the web! **The NFL has an improved website** at: http://www.nfl.com - and Sprint and Gatorade are paying upwards of $150,000 to sponsor "Cyber Showdown" and "Coaches Corner" - two feature "shows" within the site. Other sponsors include McDonald's Corp., Nike and Ford. News features of the site include real-time game-day statistics, a weekly injury report, NFL news and a game preview. ESPN will provide some content to NFL.com.

■ **Look for your local telephone bill to drop!** AT&T alone plans to capture a third of the $90 billion local market now controlled by the Bell operating companies. They view every $25.00-a-month long distance customer as a potential $100-a-month buyer of a bundled range of telecommunications which includes Internet and cellular services.

■ Christmas is coming and rumors are flying that **Nintendo may drop the entry price of its long awaited 64-bit videogame machine to $199** to hook customers on the lucrative software titles that are not interchangeable with Sega or Sony systems. Nintendo was the number one seller until Sega came out with its 32-bit Sega *Saturn*. Then Sony took the lead with its *PlayStation*. Both Sony and Sega lose millions at their $199 hardware price but make it up with software titles. The new *"Nintendo-64"* joins the brawl on September 30th. It could be the season's biggest seller!

■ **LEO (low-earth orbit) satellite-based cellular service came closer to reality** as "Iridium LLC" completed a $750 million credit agreement with 62 banks. The project (spearheaded by Motorola) seeks to orbit 66 LEO satellites to form a ceiling from which global cellular and paging calls will be returned.

■ **"Systems-on-a-Chip" is an alliance of 36 chip firms.** They seek to develop a compatible standard which will permit chips to mix-or-match with technology of other manufacturers. It soon may be possible to develop a computer having just one chip. "Modules" will be simply latched together to form one large chip.

■ **IBM has introduced a "Network Station" computer** that replaces the PC needed to access the Internet. Sales of the $700 machine is aimed at business users.

■ **Fewer "Windows-95" operating systems were sold in the initial year than projected.** But don't feel sorry for Bill Gates and Microsoft. Sales of the software product still exceeded $1 billion! The latest version of "Windows-95" comes bundled with Microsoft's new Explorer 3.0 browser.

■ **Watch for a big push this fall on the new Sony PC** named the "PCV-70". Cost will be between $2,000 and $3,000.

■ **Be on the lookout for "WebTV"** - a little set-top black box ($329) designed to provide Web access to a standard TV. They will be used to access private corporate networks (such as used in electronic banking), E-mail and the Internet. And they will sport a "smart-card" slot to facilitate electronic commerce. WebTV will also permit a TV viewer to instantly access a web site in conjunction with television show programming.

Separately, Mitsubishi says it will market 40-inch DiamondWeb televisions with a proprietary "WebView" direct Web access feature.

■ **AltaVista - the Internet search engine - joins Yahoo, Excite, and Lycos by going public.** AltaVista, a favorite among computer enthusiasts, uses super-fast technology that has applications in corporate "intranets."

■ **Like all technology products, once the newness wears off, the price drops!** In an effort to build a subscriber base, EchoStar and the DISH network have dropped the price of DBS (direct-broadcast-satellite) gear to $199. The offer runs through the end of the year. And DirecTV had a promotion at $299 and currently is offering a $200 satellite equipment rebate on a year's worth of programming. USSB (another DBS programmer) is offering $200 discount coupons. AT&T has another promotion offering $100 "instant rebate" with DBS maker, Thomson Consumer Electronics also chipping in another $100. The number of DBS subscribers has now reached 6.25 million in just 2 years and the industry wants 20 million subs by the year 2000. Cable companies are quick to point out that DBS does not include local stations, equipment installation or maintenance. And DBS may be coming to the nation's commercial airline passenger flights! Hughes (developer of DirecTV) and Boeing are working with Delta Airlines to provide airborne video.

■ **Sprint is joining the Internet race** by offering unlimited "Sprint Internet Passport" access to its 15 million subscriber base for $19.95 or a pay-as-you-go plan for $1.50 per hour. Two hundred thousand residential long-distance customers are already "test-driving" the service at no cost. The service will be rolled out to the general public later on this fall.

W5YI REPORT

America's Oldest Ham Radio Newsletter

September 15, 1996

■ **The Senate Appropriations Committee has voted to increase funding to the FCC** in fiscal 1997 by $6.82 million for a total of $192.5 million. The Commission also asked for an additional $30 million to pay for the agency's move to a new headquarters location ("The Portals") which was denied.

■ **Robert H. McNamara, N1KHF. Chief of the FCC's Private Wireless Division** has been awarded the Distinguished Service Gold Medal by the Commission for "...sustained extraordinary or exceptional accomplishments which has advanced the mission and objectives of the FCC." Part of McNamara's duties involves overseeing the Amateur Radio Service.

■ **President Clinton has named FCC lawyer Regina Keeney to fill the fifth Federal Communications Commission seat** which was made vacant by the April 1st departure of Andrew Barrett. Keeney is presently chief of the FCC's Common Carrier Bureau. Prior to that, she was the FCC Wireless Telecom Bureau Chief and lawyer for the Senate Commerce Committee.

■ **House Telecommunications Subcommittee Chairman, Jack Fields (R-Tex.) Is retiring in January.** But before before he goes, Fields wants the FCC to re-evaluate its functions and budget. He has introduced "The FCC Modernization Act of 1996."

■ **The FCC has pre-empted most local antenna restrictions** - but not those that apply to Amateur Radio. The Commission has barred local rules that "impair" a viewer's ability to install reception equipment for TV, DBS or wireless cable. Thirty-two million Americans live in areas covered by covenants, (homeowner's association rules.)

■ **A second Federal Court has declared the Communications Decency Act of 1996 unconstitutional** ruling that the measure violates protected indecent communication between adults. The law's objective is to protect children from sexually explicit content on the Internet,

AMATEUR RADIO GROWTH OVER THE PAST TEN YEARS

Extra	*Advan.*	*General*	*Tech.+*	*Tech.*	*Novice*	*Total*	*Increase*
Year ending August 31, 1986							
40455	98294	116944	86025		79359	***421077***	+2.3%
9.5%	23.5%	27.9%	20.3%		18.9%	100.0%	
Year ending August 31, 1987							
42914	98114	114737	90675		83238	***429678***	+2.0%
10.0%	22.8%	26.7%	21.1%		19.4%	100.0%	
Year ending August 31, 1988							
45909	98282	113068	98944		80502	***436705***	+1.5%
10.5%	22.5%	25.9%	22.7%		18.4%	100.0%	
Year ending August 31, 1989							
49275	101311	116289	111708		84589	***463172***	+6.1%
10.6%	21.9%	25.1%	24.1%		18.3%	100.0%	
Year ending August 31, 1990							
52700	104222	119038	124778		90932	***491670***	+6.2%
10.7%	21.2%	24.2%	25.4%		18.5%	100.0%	
Year ending August 31, 1991							
56242	106990	121832	127024	21205	96387	***529680***	+7.7%
10.8%	20.9%	23.8%	21.7%	4.0%	18.8%	100.0%	
Year ending August 31, 1992							
60405	109404	124559	129310	55899	98534	***578111***	+9.1%
10.5%	18.8%	21.6%	22.4%	9.7%	17.0%	100.0%	
Year ending August 31, 1993							
63977	111890	126666	131638	85411	101017	***620599***	+7.3%
10.3%	18.0%	20.4%	21.2%	13.8%	16.3%	100.0%	
Year ending August 31, 1994							
67681	114666	128729	134028	117345	90060	***661509***	+6.6%
10.2%	17.3%	19.5%	20.3%	17.7%	15.3%	100.0%	
Year ending August 31, 1995							
71900	117398	130021	139529	145193	97468	***701509***	+6.0%
10.3%	16.7%	18.5%	19.9%	20.7%	13.9%	100.0%	
Year ending August 31, 1996							
74149	117518	128180	149244	156909	89833	***713822***	+1.8%
10.4%	16.5%	17.8%	20.9%	22.0%	12.6%	100.0%	

(All figures provided by FCC Licensing Facility, Gettysburg, PA)

Amateur Radio Growth
NOSEDIVES!

For the past seven years, the Amateur Service had been expanding at an average rate of 7%. It came to a screeching halt during the past twelve months!

- 43% of all amateurs now hold either a Tech Plus or a Technician ham ticket - the highest percentage ever. (It was 40.6% last year.)
- The Amateur Service grew by 12,313 in the year ending August 31, 1996 - or 1.8% ...the smallest increase since before the no-code ticket.
- The total number of Tech Plus and Technician Amateurs, however, grew by 13,329.
- The total number of Extra, Advanced, General and Novice (the ones that go to trade shows and buy the high dollar HF rigs) decreased by 9,118.
- On the next page, we are listing the total number of Amateurs by license class and state for the year ended August 31, 1996 - with comparable figures for the prior year.
- Figures are for individual Amateur Radio stations only and do not include approximately 2,500 Club, Military Recreation and RACES stations.

W5YI REPORT

America's Oldest Ham Radio Newsletter

September 15, 1996

Prior to the No-Code Technician license, approximately 60% of all amateurs held a General, Advanced or Amateur Extra Class license. This percentage is now down to under 45%. The table below shows that the growth in every state has decreased dramatically! (Tech Plus and the No-Code Technician continues to increase, however.)

AMATEUR SERVICE GROWTH REPORT - SEPTEMBER 1, 1995 VS SEPTEMBER 1, 1996

STATE	EXTRA		ADVANCED		GENERAL		TECH PLUS		TECHNICIAN		NOVICE		TOTAL ALL CLASSES			INCREASE	
	1995	1996	1995	1996	1995	1996	1995	1996	1995	1996	1995	1996	1994	1995	1996	'95 %	'96 %
AL	1117	1169	1733	1706	1793	1784	2136	2321	2587	2846	1008	923	9659	10374	10749	7.4%	3.6%
AK	328	330	546	521	637	641	542	571	684	738	436	405	2984	3175	3206	6.4%	1.0%
AZ	1490	1561	2594	2584	2688	2665	2821	3089	3772	4102	1239	1164	13292	14604	15165	9.9%	3.8%
AR	733	767	1046	1064	1051	1074	1236	1342	1780	1907	612	577	5853	6458	6731	10.3%	4.2%
CA	8709	8956	16288	15810	16671	16288	22434	23580	26317	28704	16887	15786	100880	107306	109124	6.4%	1.7%
CO	1224	1274	2132	2133	2158	2107	2244	2439	2358	2624	1310	1200	10804	11453	11777	6.0%	2.8%
CT	1116	1142	1591	1531	1934	1915	1766	1844	1361	1462	1665	1559	9079	9433	9453	3.9%	0.2%
DE	199	201	236	231	290	295	304	330	248	265	210	191	1421	1487	1513	4.6%	1.7%
DC	84	81	95	95	133	125	61	72	74	65	80	64	531	527	502	(.8%)	(4.7%)
FL	4325	4461	8028	7965	9381	9366	7837	8434	6795	7150	6783	6350	40727	43149	43726	5.9%	1.3%
GA	1542	1613	2584	2575	2633	2615	3005	3235	3030	3236`	1494	1389	13374	14288	14663	6.8%	2.6%
HI	316	323	520	507	565	557	679	712	611	663	689	658	3222	3380	3420	4.9%	1.2%
ID	337	345	594	595	737	718	695	781	929	1047	410	374	3368	3702	3860	9.9%	4.3%
IL	2594	2671	4239	4140	4845	4716	4866	5159	4591	4854	3546	3262	23713	24681	24802	4.1%	0.5%
IN	1517	1558	2451	2389	2791	2764	3360	3596	3238	3439	2051	1877	14585	15408	15623	5.6%	1.4%
IA	731	755	1442	1421	1526	1482	1193	1252	1157	1248	1066	979	6835	7115	7137	4.1%	0.3%
KS	747	751	1175	1167	1609	1550	1364	1515	1685	1698	1033	922	7127	7613	7603	6.8%	(0.1%)
KY	852	918	1219	1226	1459	1452	1690	1858	2110	2347	1195	1102	7887	8525	8903	8.1%	4.4%
LA	843	850	1369	1344	1423	1383	1410	1496	1555	1626	913	831	7167	7513	7530	4.8%	0.2%
ME	497	511	731	719	1044	1029	769	825	811	909	558	523	4133	4410	4516	6.7%	2.4%
MD	1513	1516	2310	2263	2269	2226	2148	2416	2305	2416	1484	1373	11519	12029	12051	4.4%	0.2%
MA	2073	2107	2815	2695	3354	3285	3256	3354	2402	2576	2266	2123	15669	16166	16140	3.2%	0.2%
MI	2209	2293	3682	3609	4327	4271	4287	4572	4330	4679	2616	2367	20354	21451	21791	5.4%	1.6%
MN	1170	1204	2015	1995	2345	2295	2008	2179	2018	2165	1296	1183	10294	10852	11021	5.4%	1.6%
MS	493	512	831	815	858	859	823	918	1091	1194	538	497	4353	4634	4795	6.5%	3.8%
MO	1387	1449	2296	2246	2545	2595	2336	2516	2501	2788	1535	1416	11951	12699	13010	6.3%	2.5%
MT	307	314	462	472	586	578	455	523	655	729	366	336	2584	2831	2952	9.6%	4.3%
NE	396	400	792	773	982	957	768	826	681	698	484	444	3890	4103	4098	5.5%	0.1%
NV	408	425	695	703	821	839	711	825	990	1082	366	341	3665	3991	4215	8.9%	5.6%
NH	647	676	756	760	986	954	995	1057	907	990	579	533	4574	4870	4970	6.5%	2.1%
NJ	2193	2218	3248	3146	3550	3441	3704	3806	2708	2854	2614	2441	17369	18017	17906	3.7%	(0.6%)
NM	604	626	945	941	910	902	833	931	1323	1429	379	326	4570	4994	5155	9.3%	3.2%
NY	3847	3888	5923	5715	6859	6670	7175	7455	6562	7075	6950	6194	36003	37316	36997	3.6%	(0.8%)
NC	1810	1920	2909	2930	3075	3103	3307	3634	4003	4354	1979	1889	15782	17083	17830	8.2%	4.4%
ND	162	167	250	245	379	372	311	348	349	354	246	229	1584	1697	1715	7.1%	1.1%
OH	3138	3218	5060	4946	5650	5542	7452	7842	6500	6957	4101	3690	30311	31901	32195	5.2%	0.9%
OK	938	965	1535	1512	1491	1468	1842	1944	2168	2508	1122	1020	8459	9096	9417	7.5%	3.5%
OR	1236	1298	2193	2179	2738	2728	2354	2655	2554	2750	1610	1435	11894	12685	13045	6.7%	2.8%
PA	3074	3115	4573	4491	5196	5161	5155	5461	4309	4558	3610	3217	24734	25917	26003	4.8%	0.3%
RI	332	353	379	370	538	524	585	633	368	391	416	383	2510	2618	2654	4.3%	1.4%
SC	685	728	1105	1107	1354	1354	1276	1403	1275	1403	687	624	5913	6382	6624	7.9%	3.8%
SD	179	178	321	314	381	371	252	281	275	297	174	164	1514	1582	1605	4.5%	1.5%
TN	1499	1553	2379	2378	2300	2314	3027	3232	3051	3286	1465	1351	12872	13721	14114	6.6%	2.9%
TX	4687	4852	7592	7542	7811	7667	8262	8824	8869	9645	4364	4021	39025	41585	42551	6.6%	2.3%
UT	475	504	826	835	761	768	1609	1722	2664	3041	751	697	6290	7086	7567	12.7%	6.8%
VT	261	266	333	333	437	434	400	427	494	538	229	210	1971	2154	2208	9.3%	2.5%
VA	2077	2161	3120	3085	3095	3064	3155	3497	3328	3450	2016	1876	15805	16791	17133	6.2%	2.0%
WA	2374	2473	3812	3786	4535	4478	4798	5211	5383	5861	3092	2838	22333	23994	24647	7.4%	2.7%
WV	578	602	749	739	951	944	1204	1280	1720	1927	852	738	5592	6054	6230	8.3%	2.9%
WI	1165	1208	1869	1852	2206	2160	1876	2034	2176	2350	1278	1169	9984	10570	10773	5.9%	1.9%
WY	179	188	242	240	283	289	293	318	394	417	220	205	1516	1611	1657	6.3%	2.9%
GU	59	63	54	50	61	65	97	105	156	192	170	164	503	597	639	18.7%	7.0%
PR	271	286	580	587	738	782	2211	2367	577	728	4319	4100	8521	8696	8850	2.1%	1.8%
VI	55	56	55	53	81	85	57	60	65	75	46	40	355	359	369	1.1%	2.9%
Other	117	130	77	88	99	109	94	137	321	376	54	63	591	762	903	28.9%	17.1%
95:	**71900**		**117398**		**130021**		**139529**		**145193**		**97468**		661509	701509	713822	**6.0%**	**1.8%**
%	10.3%		16.7%		18.5%		19.9%		20.7%		13.9%		100%	100%	100%		
96:	**74149**		**117518**		**128180**		**149244**		**156909**		**89833**						
%	10.4%		16.5%		17.8%		20.9%		22.0%		12.6%		100%	100%	100%		
% Inc.	**+3.1%**		**+0.1%**		**(-1.4%)**		**+7.0%**		**+8.1%**		**-(7.8%)**						

*(*** = Other includes U.S. small island possessions and APO/FPO addresses.)*

W5YI REPORT

America's Oldest Ham Radio Newsletter

Page #8

September 15, 1996

AMATEUR RADIO STATION CALL SIGNS

...sequentially issued as of the first of September 1996:

Radio District	Gp."A" Extra	Gp."B" Advan.	Gp."C" Tech/Gen	Gp."D" Novice
0 (*)	AB0CR	KI0EG	(***)	KB0YJM
1 (*)	AA1QM	KE1FY	N1XUO	KB1BZG
2 (*)	AB2BZ	KG2IE	(***)	KB2ZTL
3 (*)	AA3OV	KE3XL	N3YAE	KB3BPY
4 (*)	AE4XV	KT4VI	(***)	KF4LUS
5 (*)	AC5JP	KM5CV	(***)	KC5VZK
6 (*)	AC6XH	KQ6IX	(***)	KF6GBD
7 (*)	AB7SJ	KK7AN	(***)	KC7SNL
8 (*)	AA8XU	KG8YK	(***)	KC8ETM
9 (*)	AA9TF	KG9HW	(***)	KB9OJR
N. Mariana	NH0A	AH0AW	KH0FJ	WH0ABF
Guam	WH2X	AH2DB	KH2QT	WH2ANR
Johnston Is.	AH3D	AH3AD	KH3AG	WH3AAG
Midway Is.		AH4AA	KH4AG	WH4AAH
Hawaii	(**)	AH6OT	KH7BF	WH6DCN
Kure Is.			KH7AA	
Amer.Samoa	AH8O	AH8AH	KH8DA	WH8ABF
Wake W.Peale	AH9C	AH9AD	KH9AE	WH9AAI
Alaska	(**)	AL7QR	KL0AQ	WL7CTX
Virgin Is.	WP2X	KP2CJ	NP2JL	WP2AIE
Puerto Rico	KP3L	KP3AI	NP3FG	WP4NMI

* = All 1-by-2 & 2-by-1 call signs have been assigned.

** = All 2-by-1 call signs have been assigned.

***= Group "C" (N-by-3) call signs have now run out in all but the 1st and 3rd call district.

Note: KP3/NP3 call signs now assigned in Puerto Rico and KH7 in Hawaii

[Source: FCC, Gettysburg, Pennsylvania]

NEW AND UPGRADING AMATEUR STATISTICS

For the Month of August 1995 vs August 1996

License Class	New Amateurs 1995	New Amateurs 1996	Upgrading Amateurs 1995	Upgrading Amateurs 1996
Novice	41	52	5	0
Technician	2154	1632	11	0
Tech Plus	255	130	304	316
General	113	15	445	289
Advanced	22	3	266	232
Extra Class	16	5	321	176
Club	232	59	9	0
Total:	**2833**	**1896**	**1361**	**1119**
Decrease:		**(33.1%)**		**(17.8%)**

- The above figures were developed by *The W5YI Group* by downloading and customizing the FCC's Amateur Service database and accessing first time licensed (shown with an "A" in the record) and upgrading amateurs (indicated with a "B") by license class over a specified range ... the month of August 1995 and August 1996. The FCC no longer publishes these figures.

STORY BEHIND THE RF SAFETY GUIDELINES

What you won't read in QST!

The ARRL has reported on the new FCC RF safety standards which include Amateur Radio for the first time. They have not, however, reported on the internal turmoil that unfolded in the two year period before the new RF exposure rules were adopted. And they are not likely to. Here is what happened.

The RF portion of the electromagnetic spectrum is generally considered to range from 3 kHz to 300 GHz. All transmissions by amateur operators, of course, occur in this range. As a general rule, the higher the frequency, the greater the energy content and potential for damage through heating of biological tissue. There is disagreement over exactly what levels of RF radiation are "safe," particularly with regard to low levels of exposure.

Under the *National Environmental Policy Act of 1969*, the Commission is required to consider environmental effects when performing its licensing and regulatory functions. However, the FCC is not a proficient health and safety agency and must, therefore, rely on expert organizations for guidance on appropriate standards to use to ensure the safety of equipment that emits RF radiation.

These expert health and safety agencies are primarily the Environmental Protection Agency and the Food and Drug Administration, ...and to a lessor extent the National Institute for Occupational Safety and Health and the Occupational Safety and Health Administration.

The new guidelines (ANSI/IEEE C95.1-1992) were developed to replace those previously used by the FCC for environmental evaluation (ANSI/IEEE C95.1-1982.) The Commission adopted the 1982 ANSI standard in 1985 noting that the ANSI standard was widely accepted and was technically and scientifically supportable.

The 1982 safety recommendations were meant to alert everyone of the possible harmful effects in human beings of RF fields between 200 kHz and 100 GHz and make wide use of a term called "specific absorption rate," or SAR. This basically is the time frame in which RF is absorbed into the human body.

For the last ten years, the FCC has used this standard as its processing guideline for determining the potential environmental impact of RF emissions. Applicants for certain radio facilities had to prepare an *Environmental Assessment* (EA) if the transmitter could expose the general public or workers to levels of RF radiation that are in excess of the 1982 ANSI guidelines. Many low power and intermittent RF transmitters (including amateur radio) were "categorically excluded" from routine evaluation for RF radiation exposure based on data indicating that they would not normally cause exposures in excess of the guidelines.

In 1990 the FCC and EPA completed a joint measurement study of amateur radio installations in Southern

California. The objective was to obtain information on the potential impact of RF fields on ham operators and others who might be present in the immediate vicinity of the station.

The results of the test showed that while some field strengths at HF frequencies can be relatively high, the potential hazard may be less than for lower field strengths measured at VHF frequencies where the highest specific absorption rates (SARs) occur in human beings. Ground level field strength readings at HF frequencies were relatively low. You had to get into the main "beam" path to obtain significant radiation levels.

It appears that vehicle-mounted amateur antennas which are closer to the ground create the greatest possibility for significant exposure in publicly accessible areas. There were several cases where the peak levels of RF exposure exceeded limits recommended for residential ("uncontrolled") locations. Generally, RF field strengths encountered inside ham shacks were well below IEEE recommended exposure limits.

New updated RF safety standards proposed

On March 11, 1993, the FCC issued a *Notice of Proposed Rulemaking* which looked toward using the RF guidelines adopted in 1992 by the *American National Standards Institute* (ANSI) and the *Institute of Electrical and Electronic Engineers* (IEEE) as their standard for evaluating environmental radiofrequency (RF) radiation from FCC regulated transmitters. The 1992 ANSI/IEEE standard is generally more restrictive in the amount of environmental RF exposure permitted.

The 1992 ANSI/IEEE standard specifies two tiers of exposure criteria, one tier for "controlled environments" (usually involving workers) and another, more stringent tier, for "uncontrolled environments" (usually involving the general public). Since they are usually in residential environments, Amateur radio installations can be both in a "controlled" and "uncontrolled environment."

The 1982 ANSI standard specified only one set of exposure limits, regardless of whether the individual exposed was a worker or a member of the general public. It is also generally more restrictive in the evaluation of low-power devices, such as hand-held radios and cellular telephones, than the 1982 standard which permitted exclusion from compliance with the MPE limits if the input power of the radiating device was 7 watts or less. The new guidelines also proposed to eliminate the categorical exemption for radio amateurs, which could result in amateurs having to prove that their transmissions do not expose anyone to RF radiation in excess of the 1992 ANSI/IEEE guidelines. The new standard is five times more strict for devices operating in "uncontrolled" environments and include all hand-held radios where the antenna is located close to body of the user.

The deadline for comments on the new proposed RF safety guidelines was January 25, 1994 - later extended to April 25th. The EPA did not like the terms "controlled" and "uncontrolled" environments. They preferred "workers" and the "public" with all amateur operators being part of the "public." This would have subjected all amateur radio transmissions to the more stringent guidelines.

ARRL dispute over RF safety standards

The ARRL wanted continuation of the categorical exemption for radio amateurs and said that "...the FCC should rely on amateur self-training and educational efforts to ensure RF safety in the service." Their blue ribbon *Committee on the Biological Effects of RF Energy* consisted of recognized experts in the field biological hazards of RF radiation.

It was appointed in January 1990 by then ARRL Pres. Larry Price, W4RA "...with the distinctive charge of revitalizing organized amateur radio's concern for the limitation of bio-effects hazards that might arise from the participation of individuals in the hobby of amateur radio."

Wayne Overbeck, Ph.D (N6NB, Tustin, CA) then ARRL Southwestern Division Vice Director was appointed Board Liaison with Ivan Shulman, M.D., as Bio-Effects Committee Chairman (WC2S, Malibu, CA). The other members consisted of W. Ross Adey, M.D. (K6UI, Redlands, CA), David J. Rodman, M.D. (KN2M, Buffalo, NY), Samuel Milham, M.D., and Thomas Rozzell, ScD (WA4ZTT, Fairfax, VA).

The ARRL saw the primary job of its Bio-Effects Committee as an advisor to the ARRL Board on RF and health. But they never said that the Board would take their advice ...and they didn't. The Committee vehemently disagreed with the Board's position that amateur radio should continue to be categorically exempt from compliance with any FCC-adopted radiation safety standard.

Since the Board ignored their recommendations, Wayne Overbeck and the Bio-Effects Committee ended up filing comments on their own behalf as the "Amateur Radio Health Group" and not as ARRL representatives.

They noted that certain amateur stations ..such as vehicular VHF installations, hand-held radios, stations with indoor antennas and high power HF operations (such as "moonbounce") could produce higher fields than the ANSI/ IEEE standard would allow.

The group believes that all hand-held transceivers with power outputs exceeding 1.4 W should be required to have prominent warnings mounted on the unit itself, about the "probable hazards associated with their use."

It also said that, "Education alone cannot work if a large percentage of radio amateurs neither read the publications nor join the organizations that endeavor to educate them." The Health Group recommended that the FCC publish a guide "...showing required separation distances between antennas and inhabited areas for each

amateur band and each major antenna type, with transmitter power levels of 10 watts, 100 watts and 1000 watts, for example."

"The FCC should not subject all amateurs to the requirements of environmental studies and processing, because it would be too expensive and would inundate the FCC with paperwork. Instead the FCC should place in Part 97 a chart showing the calculated field intensities at various distances from antennas having various directive patterns, driven by transmitters of various power output levels. This chart might indicate the thresholds set by the 1992 ANSI guideline, if the FCC chooses to adopt that guideline as a standard exposure to RF energy. The FCC could also add questions about electromagnetic safety to license exams, and require applicants to certify that they have read and understood the FCC guidelines and agree to comply."

After the Board learned that members of the ARRL Bio-Effects Committee had filed comments in this proceeding, the League required that Committee members sign a statement — to be attached to the League's reply comments — intended to soften the disagreement between the Board and the Bio-Effects Committee. They were even told what the statement should say.

When it became apparent that committee members were unwilling to comply, the principal author of the comments, Wayne Overbeck, N6NB was dismissed. The Bio-Effects Committee angrily charged that "This sequence of events would suggest that in the Board's view, the Bio-Effects Committee exists not to provide expert advice to the Board but instead to lend credibility to whatever position the board chooses to adopt."

The ARRL Bio-Effects Committee Quits!

On June 1, 1994 the ARRL's entire hand-picked committee of internationally acknowledged experts in the field of potential health risks from exposure due to RF radiation resigned! The League's Bio-Effects chairman, Dr. Ivan Shulman, WC2S wrote a stinging 5-page letter to League President George Wilson, W4OYI telling him why the Committee resignation was necessary.

"The impact of the new guidelines to amateur radio is massive," Shulman said, "since ham operators are exposed to RF radiation on a voluntary (controlled) basis and their neighbors are exposed on an involuntary (uncontrolled) basis. The new guidelines also extend the frequency range under consideration from 3 kHz to 300 GHZ - every ham band! Hand-held transceivers also are scheduled to come under new scrutiny. Previously hand-held transceivers radiating under 7 watts were excluded."

"Unbelievably, as important as this proposal was to amateur radio operations, the League's Board of Directors chose to exclude participation by its own chosen panel of experts, the ARRL Bio-Effects Committee. ...The members of the ARRL Bio-Effects Committee plan to continue to contribute to an understanding by amateur radio operators of the issues relating to the potential biohazards of our activities as radio operators, and as such will remain active in our continued review of information and research in this field as it becomes available."

"We plan to remain available to any and all amateur radio operators who seek our counsel. We further plan to continue to speak out in matters that concern us as individuals and as private citizens as they pertain to our deep and fundamental interest in amateur radio."

"We will, however, not allow our names to be subject to the political machinations and narrow views of individuals who seek to use us for their own aims as 'window dressing' for you or the League."

Ruling by FCC on RF exposure guidelines

On August 1st, the FCC's Office of Engineering and Technology adopted the new guidelines and methods for evaluating the environmental effects of radiofrequency (RF) radiation from FCC-regulated transmitters - including amateur radio.

The RF safety rules applying to amateur radio were essentially as suggested in the comments by Wayne Overbeck, N6NB and the Amateur Radio Health Group.

1. The FCC expects amateurs to comply with the new RF guidelines or to file an *Environmental Assessment* (EA) for review. Amateur radio stations will no longer have a blanket RF safety exemption.
2. The FCC "...will rely upon amateur licensees to demonstrate their knowledge of our guidelines through examinations." Five additional questions are being added to the Element 2, 3A and 3B pools.
3. Amateur licensees transmitting with more than 50 watts output power must insure that their station adequately provides for RF safety. This might require "... altering operating patterns, relocating the antenna, revising the station's technical parameters such as frequency, power or emission type or combinations of these and other remedies. No action is required if transmitter power is below 50 watts.
4. Applicants for new amateur licenses and renewals must certify that they have read and understand the rules regarding RF exposure.
5. The amateur community is encouraged to develop and disseminate information in the form of tables, charts and computer analytical tools that relate such variables as operating patterns, emission types, frequencies, power and distance from antennas.
6. The FCC will develop a bulletin to "...provide straightforward methods for amateur operators to determine potential exposure levels."
7. The new guidelines apply to amateur stations beginning January 1, 1997.